

## SEQUENCE LISTING

<110> MILBRANDT, Jeffrey D.  
BALOH, Robert H.

<120> GFR-alpha-1-RET Specific Agonists and Methods Therefor

<130> 6029-9879

<140>

<141>

<160> 28

<170> PatentIn Ver. 2.0

<210> 1

<211> 89

<212> PRT

<213> Homo sapiens

<400> 1

```
Cys Gln Leu Trp Ser Leu Thr Leu Ser Val Ala Glu Leu Gly Leu Gly
 1              5              10              15
Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys
          20              25              30
Pro Arg Gly Ala Arg Thr Gln His Gly Leu Ala Leu Ala Arg Leu Gln
          35              40              45
Gly Gln Gly Arg Ala His Gly Gly Pro Cys Cys Arg Pro Thr Arg Tyr
 50              55              60
Thr Asp Val Ala Phe Leu Asp Asp Arg His Arg Trp Gln Arg Leu Pro
 65              70              75              80
Gln Leu Ser Ala Ala Ala Cys Gly Cys
          85
```

<210> 2

<211> 89

<212> PRT

<213> Mouse

<400> 2

```
Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu Gly Leu Gly
 1              5              10              15
Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys
          20              25              30
Pro Gln Glu Ala Arg Thr Gln His Ser Leu Val Leu Ala Arg Leu Arg
          35              40              45
Gly Arg Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro Thr Ser Tyr
 50              55              60
Ala Asp Val Thr Phe Leu Asp Asp Gln His His Trp Gln Gln Leu Pro
 65              70              75              80
Gln Leu Ser Ala Ala Ala Cys Gly Cys
          85
```

<210> 3  
 <211> 89  
 <212> PRT  
 <213> RAT

<400> 3  
 Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu Gly Leu Gly  
 1 5 10 15  
 Tyr Ala Ser Glu Glu Lys Ile Ile Phe Arg Tyr Cys Ala Gly Ser Cys  
 20 25 30  
 Pro Gln Glu Val Arg Thr Gln His Ser Leu Val Leu Ala Arg Leu Arg  
 35 40 45  
 Gly Gln Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro Thr Ser Tyr  
 50 55 60  
 Ala Asp Val Thr Phe Leu Asp Asp His His His Trp Gln Gln Leu Pro  
 65 70 75 80  
 Gln Leu Ser Ala Ala Ala Cys Gly Cys  
 85

<210> 4  
 <211> 93  
 <212> PRT  
 <213> Homo sapiens

<400> 4  
 Cys Val Leu Thr Ala Ile His Leu Asn Val Thr Asp Leu Gly Leu Gly  
 1 5 10 15  
 Tyr Glu Thr Lys Glu Glu Leu Ile Phe Arg Tyr Cys Ser Gly Ser Cys  
 20 25 30  
 Asp Ala Ala Glu Thr Thr Tyr Asp Lys Ile Leu Lys Asn Leu Ser Arg  
 35 40 45  
 Asn Arg Arg Leu Val Ser Asp Lys Val Gly Gln Ala Cys Cys Arg Pro  
 50 55 60  
 Ile Ala Phe Asp Asp Asp Leu Ser Phe Leu Asp Asp Asn Leu Val Tyr  
 65 70 75 80  
 His Ile Leu Arg Lys His Ser Ala Lys Arg Cys Gly Cys  
 85 90

<210> 5  
 <211> 93  
 <212> PRT  
 <213> Mouse

<400> 5  
 Cys Val Leu Thr Ala Ile His Leu Asn Val Thr Asp Leu Gly Leu Gly  
 1 5 10 15  
 Tyr Glu Thr Lys Glu Glu Leu Ile Phe Arg Tyr Cys Ser Gly Ser Cys  
 20 25 30  
 Glu Ser Ala Glu Thr Met Tyr Asp Lys Ile Leu Lys Asn Leu Ser Arg  
 35 40 45

Ser Arg Arg Leu Thr Ser Asp Lys Val Gly Gln Ala Cys Cys Arg Pro  
50 55 60

Val Ala Phe Asp Asp Asp Leu Ser Phe Leu Asp Asp Asn Leu Val Tyr  
65 70 75 80

His Ile Leu Arg Lys His Ser Ala Lys Arg Cys Gly Cys  
85 90

<210> 6  
<211> 93  
<212> PRT  
<213> RAT

<400> 6  
Cys Val Leu Thr Ala Ile His Leu Asn Val Thr Asp Leu Gly Leu Gly  
1 5 10 15

Tyr Glu Thr Lys Glu Glu Leu Ile Phe Arg Tyr Cys Ser Gly Ser Cys  
20 25 30

Glu Ala Ala Glu Thr Met Tyr Asp Lys Ile Leu Lys Asn Leu Ser Arg  
35 40 45

Ser Arg Arg Leu Thr Ser Asp Lys Val Gly Gln Ala Cys Cys Arg Pro  
50 55 60

Val Ala Phe Asp Asp Asp Leu Ser Phe Leu Asp Asp Ser Leu Val Tyr  
65 70 75 80

His Ile Leu Arg Lys His Ser Ala Lys Arg Cys Gly Cys  
85 90

<210> 7  
<211> 94  
<212> PRT  
<213> Homo sapiens

<400> 7  
Cys Gly Leu Arg Glu Leu Glu Val Arg Val Ser Glu Leu Gly Leu Gly  
1 5 10 15

Tyr Ala Ser Asp Glu Thr Val Leu Phe Arg Tyr Cys Ala Gly Ala Cys  
20 25 30

Glu Ala Ala Ala Arg Val Tyr Asp Leu Gly Leu Arg Arg Leu Arg Gln  
35 40 45

Arg Arg Arg Leu Arg Arg Glu Arg Val Arg Ala Gln Pro Cys Cys Arg  
50 55 60

Pro Thr Ala Tyr Glu Asp Glu Val Ser Phe Leu Asp Ala His Ser Arg  
65 70 75 80

Tyr His Thr Val His Glu Leu Ser Ala Arg Glu Cys Ala Cys  
85 90

<210> 8  
<211> 94  
<212> PRT  
<213> Mouse

&lt;400&gt; 8

Cys Gly Leu Arg Glu Leu Glu Val Arg Val Ser Glu Leu Gly Leu Gly  
 1 5 10 15

Tyr Thr Ser Asp Glu Thr Val Leu Phe Arg Tyr Cys Ala Gly Ala Cys  
 20 25 30

Glu Ala Ala Ile Arg Ile Tyr Asp Leu Gly Leu Arg Arg Leu Arg Gln  
 35 40 45

Arg Arg Arg Val Arg Arg Glu Arg Ala Arg Ala His Pro Cys Cys Arg  
 50 55 60

Pro Thr Ala Tyr Glu Asp Glu Val Ser Phe Leu Asp Val His Ser Arg  
 65 70 75 80

Tyr His Thr Leu Gln Glu Leu Ser Ala Arg Glu Cys Ala Cys  
 85 90

&lt;210&gt; 9

&lt;211&gt; 96

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;400&gt; 9

Cys Arg Leu Arg Ser Gln Leu Val Pro Val Arg Ala Leu Gly Leu Gly  
 1 5 10 15

His Arg Ser Asp Glu Leu Val Arg Phe Arg Phe Cys Ser Gly Ser Cys  
 20 25 30

Arg Arg Ala Arg Ser Pro His Asp Leu Ser Leu Ala Ser Leu Leu Gly  
 35 40 45

Ala Gly Ala Leu Arg Pro Pro Pro Gly Ser Arg Pro Val Ser Gln Pro  
 50 55 60

Cys Cys Arg Pro Thr Arg Tyr Glu Ala Val Ser Phe Met Asp Val Asn  
 65 70 75 80

Ser Thr Trp Arg Thr Val Asp Arg Leu Ser Ala Thr Ala Cys Gly Cys  
 85 90 95

&lt;210&gt; 10

&lt;211&gt; 96

&lt;212&gt; PRT

&lt;213&gt; Mouse

&lt;400&gt; 10

Cys Arg Leu Arg Ser Gln Leu Val Pro Val Ser Ala Leu Gly Leu Gly  
 1 5 10 15

His Ser Ser Asp Glu Leu Ile Arg Phe Arg Phe Cys Ser Gly Ser Cys  
 20 25 30

Arg Arg Ala Arg Ser Gln His Asp Leu Ser Leu Ala Ser Leu Leu Gly  
 35 40 45

Ala Gly Ala Leu Arg Ser Pro Pro Gly Ser Arg Pro Ile Ser Gln Pro  
 50 55 60

Cys Cys Arg Pro Thr Arg Tyr Glu Ala Val Ser Phe Met Asp Val Asn  
 65 70 75 80  
 Ser Thr Trp Arg Thr Val Asp His Leu Ser Ala Thr Ala Cys Gly Cys  
 85 90 95

<210> 11  
 <211> 109  
 <212> PRT  
 <213> MURINE

<400> 11  
 Ala Leu Ala His His His His His Asp Tyr Lys Asp Asp Asp Asp  
 1 5 10 15  
 Lys Gly Ser Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu  
 20 25 30  
 Gly Leu Gly Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala  
 35 40 45  
 Gly Ser Cys Pro Gln Glu Ala Arg Thr Gln His Ser Leu Val Leu Ala  
 50 55 60  
 Arg Leu Arg Gly Arg Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro  
 65 70 75 80  
 Thr Ala Phe Asp Asp Asp Val Thr Phe Leu Asp Asp Gln His His Tyr  
 85 90 95  
 His Ile Leu Arg Lys His Ser Ala Ala Ala Cys Gly Cys  
 100 105

<210> 12  
 <211> 90  
 <212> PRT  
 <213> MURINE

<400> 12  
 Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu Gly Leu Gly  
 1 5 10 15  
 Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys  
 20 25 30  
 Pro Gln Glu Ala Arg Thr Gln His Ser Leu Val Leu Ala Arg Leu Arg  
 35 40 45  
 Gly Arg Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro Thr Ala Phe  
 50 55 60  
 Asp Asp Asp Val Thr Phe Leu Asp Asp Gln His His Tyr His Ile Leu  
 65 70 75 80  
 Arg Lys His Ser Ala Ala Ala Cys Gly Cys  
 85 90

<210> 13  
 <211> 109  
 <212> PRT

<213> Mouse

<400> 13

```

Ala Leu Ala His His His His His His Asp Tyr Lys Asp Asp Asp Asp
 1                      5                      10                      15

Lys Gly Ser Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu
                20                      25                      30

Gly Leu Gly Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala
                35                      40                      45

Gly Ser Cys Pro Gln Glu Ala Arg Thr Gln His Ser Leu Val Leu Ala
 50                      55                      60

Arg Leu Arg Gly Arg Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro
 65                      70                      75                      80

Thr Ala Tyr Glu Asp Glu Val Thr Phe Leu Asp Asp Gln His His Tyr
                85                      90                      95

His Thr Leu Gln Glu Leu Ser Ala Ala Ala Cys Gly Cys
                100                      105

```

<210> 14

<211> 90

<212> PRT

<213> Mouse

<400> 14

```

Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu Gly Leu Gly
 1                      5                      10                      15

Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys
                20                      25                      30

Pro Gln Glu Ala Arg Thr Gln His Ser Leu Val Leu Ala Arg Leu Arg
 35                      40                      45

Gly Arg Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro Thr Ala Tyr
 50                      55                      60

Glu Asp Glu Val Thr Phe Leu Asp Asp Gln His His Tyr His Thr Leu
 65                      70                      75                      80

Gln Glu Leu Ser Ala Ala Ala Cys Gly Cys
                85                      90

```

<210> 15

<211> 108

<212> PRT

<213> Mouse

<400> 15

```

Ala Leu Ala His His His His His His Asp Tyr Lys Asp Asp Asp Asp
 1                      5                      10                      15

Lys Gly Ser Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu
                20                      25                      30

Gly Leu Gly Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala
 35                      40                      45

```

Gly Ser Cys Pro Gln Glu Ala Arg Thr Gln His Ser Leu Val Leu Ala  
 50 55 60  
 Arg Leu Arg Gly Arg Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro  
 65 70 75 80  
 Thr Arg Tyr Glu Ala Val Thr Phe Leu Asp Asp Gln His His Trp Arg  
 85 90 95  
 Thr Val Asp His Leu Ser Ala Ala Ala Cys Gly Cys  
 100 105

<210> 16  
 <211> 89  
 <212> PRT  
 <213> Mouse

<400> 16  
 Cys Arg Leu Trp Ser Leu Thr Leu Pro Val Ala Glu Leu Gly Leu Gly  
 1 5 10 15  
 Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys  
 20 25 30  
 Pro Gln Glu Ala Arg Thr Gln His Ser Leu Val Leu Ala Arg Leu Arg  
 35 40 45  
 Gly Arg Gly Arg Ala His Gly Arg Pro Cys Cys Gln Pro Thr Arg Tyr  
 50 55 60  
 Glu Ala Val Thr Phe Leu Asp Asp Gln His His Trp Arg Thr Val Asp  
 65 70 75 80  
 His Leu Ser Ala Ala Ala Cys Gly Cys  
 85

<210> 17  
 <211> 5  
 <212> PRT  
 <213> Homo sapiens

<400> 17  
 Ala Phe Asp Asp Asp  
 1 5

<210> 18  
 <211> 5  
 <212> PRT  
 <213> Homo sapiens

<400> 18  
 Ala Tyr Glu Asp Glu  
 1 5

<210> 19  
 <211> 4  
 <212> PRT  
 <213> Homo sapiens

<400> 19  
 Arg Tyr Glu Ala  
 1

<210> 20  
 <211> 7  
 <212> PRT  
 <213> Homo sapiens

<400> 20  
 Tyr His Ile Leu Arg Lys His  
 1 5

<210> 21  
 <211> 7  
 <212> PRT  
 <213> Homo sapiens

<400> 21  
 Tyr His Thr Val His Glu Leu  
 1 5

<210> 22  
 <211> 7  
 <212> PRT  
 <213> Homo sapiens

<400> 22  
 Trp Arg Thr Val Asp Arg Leu  
 1 5

<210> 23  
 <211> 90  
 <212> PRT  
 <213> Homo sapiens

<400> 23  
 Cys Gln Leu Trp Ser Leu Thr Leu Ser Val Ala Glu Leu Gly Leu Gly  
 1 5 10 15  
 Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys  
 20 25 30  
 Pro Arg Gly Ala Arg Thr Gln His Gly Leu Ala Leu Ala Arg Leu Gln  
 35 40 45  
 Gly Gln Gly Arg Ala His Gly Gly Pro Cys Cys Arg Pro Thr Ala Phe  
 50 55 60  
 Asp Asp Asp Val Ala Phe Leu Asp Asp Arg His Arg Tyr His Ile Leu  
 65 70 75 80  
 Arg Lys His Ser Ala Ala Ala Cys Gly Cys  
 85 90

<210> 24  
 <211> 90  
 <212> PRT  
 <213> Homo sapiens

<400> 24  
 Cys Gln Leu Trp Ser Leu Thr Leu Ser Val Ala Glu Leu Gly Leu Gly  
 1 5 10 15



Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys  
                   20                  25                  30  
 Pro Arg Gly Ala Arg Thr Gln His Gly Leu Ala Leu Ala Arg Leu Gln  
                   35                  40                  45  
 Gly Gln Gly Arg Ala His Gly Gly Pro Cys Cys Arg Pro Thr Ala Tyr  
                   50                  55                  60  
 Glu Asp Glu Val Ala Phe Leu Asp Asp Arg His Arg Tyr His Thr Val  
                   65                  70                  75                  80  
 His Glu Leu Ser Ala Ala Ala Cys Gly Cys  
                   85                  90

<210> 25  
 <211> 89  
 <212> PRT  
 <213> Homo sapiens

<400> 25  
 Cys Gln Leu Trp Ser Leu Thr Leu Ser Val Ala Glu Leu Gly Leu Gly  
                   1                  5                  10                  15  
 Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr Cys Ala Gly Ser Cys  
                   20                  25                  30  
 Pro Arg Gly Ala Arg Thr Gln His Gly Leu Ala Leu Ala Arg Leu Gln  
                   35                  40                  45  
 Gly Gln Gly Arg Ala His Gly Gly Pro Cys Cys Arg Pro Thr Arg Tyr  
                   50                  55                  60  
 Glu Ala Val Ala Phe Leu Asp Asp Arg His Arg Trp Arg Thr Val Asp  
                   65                  70                  75                  80  
 Arg Leu Ser Ala Ala Ala Cys Gly Cys  
                   85

<210> 26  
 <211> 97  
 <212> PRT  
 <213> Homo sapiens

<400> 26  
 Ala Leu Ser Gly Pro Cys Gln Leu Trp Ser Leu Thr Leu Ser Val Ala  
                   1                  5                  10                  15  
 Glu Leu Gly Leu Gly Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr  
                   20                  25                  30  
 Cys Ala Gly Ser Cys Pro Arg Gly Ala Arg Thr Gln His Gly Leu Ala  
                   35                  40                  45  
 Leu Ala Arg Leu Gln Gly Gln Gly Arg Ala His Gly Gly Pro Cys Cys  
                   50                  55                  60  
 Arg Pro Thr Ala Phe Asp Asp Asp Val Ala Phe Leu Asp Asp Arg His  
                   65                  70                  75                  80  
 Arg Tyr His Ile Leu Arg Lys His Ser Ala Ala Ala Cys Gly Cys Gly  
                   85                  90                  95

Gly

<210> 27  
 <211> 97  
 <212> PRT  
 <213> Homo sapiens

<400> 27  
 Ala Leu Ser Gly Pro Cys Gln Leu Trp Ser Leu Thr Leu Ser Val Ala  
   1                  5                  10                  15  
 Glu Leu Gly Leu Gly Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr  
           20                  25                  30  
 Cys Ala Gly Ser Cys Pro Arg Gly Ala Arg Thr Gln His Gly Leu Ala  
           35                  40                  45  
 Leu Ala Arg Leu Gln Gly Gln Gly Arg Ala His Gly Gly Pro Cys Cys  
   50                  55                  60  
 Arg Pro Thr Ala Tyr Glu Asp Glu Val Ala Phe Leu Asp Asp Arg His  
   65                  70                  75                  80  
 Arg Tyr His Thr Val His Glu Leu Ser Ala Ala Ala Cys Gly Cys Gly  
                   85                  90                  95  
 Gly

<210> 28  
 <211> 96  
 <212> PRT  
 <213> Homo sapiens

<400> 28  
 Ala Leu Ser Gly Pro Cys Gln Leu Trp Ser Leu Thr Leu Ser Val Ala  
   1                  5                  10                  15  
 Glu Leu Gly Leu Gly Tyr Ala Ser Glu Glu Lys Val Ile Phe Arg Tyr  
           20                  25                  30  
 Cys Ala Gly Ser Cys Pro Arg Gly Ala Arg Thr Gln His Gly Leu Ala  
           35                  40                  45  
 Leu Ala Arg Leu Gln Gly Gln Gly Arg Ala His Gly Gly Pro Cys Cys  
   50                  55                  60  
 Arg Pro Thr Arg Tyr Glu Ala Val Ala Phe Leu Asp Asp Arg His Arg  
   65                  70                  75                  80  
 Trp Arg Thr Val Asp Arg Leu Ser Ala Ala Ala Cys Gly Cys Gly Gly  
                   85                  90                  95